

THE LONG-TAILED MACAQUE MONKEYS (*MACACA
RADIATA* AND *M. SINICA*) OF SOUTHERN INDIA
AND CEYLON.

BY

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Examination of the Bonnet Monkeys collected in the Eastern Ghats and a comparison of them with the splendid series of skins and skulls previously collected by the Mammal Survey in various parts of South India yielded so many interesting results, never before recorded, that I was induced to take up the study of the Ceylon species as well. My observations and conclusions are set forth in the following pages.

THE BONNET MACAQUE (*Macaca radiata*).

The Colour-variations of the Bonnet Macaque.

In view of the evidence I have discovered for the existence of more than one race of this monkey in India, it must be recalled that Geoffroy's description of his example as 'brun-verdatre' fixes the colour of the typical sub-species or local race. I consequently assign to this race (*M. radiata radiata*) a number of specimens, obtained in several districts by the Survey, which exhibit various shades of olive-brown.

A hasty inspection of the skins suggests at first the occurrence of local races of this type; but the available evidence points to the conclusion that the marked differences in tint are due to seasonal change. Unfortunately it was not possible to collect throughout the year a series of examples attesting month by month the changes in colour and coat in one locality. When this is done for various districts, it may prove that more than one race is represented by the olive-brown type. But at present there is not sufficient material to justify, in my opinion, that conclusion.

The general tint of the winter coat on the dorsal area is deep brown or olive-brown with little, if any, pale ticking or speckling in the hair. The long radiating hairs on the bonnet and the short hairs diverging from the middle line of the forehead in front are greyish brown at the base, blackish distally. The outer sides of the arms are rather paler than the back, there being more grey in the hair; and the legs and feet are greyer than the arms. The tail is black above in its basal half, turning to deep brown distally.

The under side and inner side of the limbs are clothed with whitish grey hairs which show up conspicuously on the black pigmented skin of the chest and abdomen.

In the spring and early summer the long hairs of the upper side fade through the greater part of their length to a pale buffish tint giving a decidedly pale olive-grey or buffy grey colour to the skins. The hair then looks dull, lustre-less and shaggy and is decidedly coarser to the touch than the rich brown coat of mid-winter.

The following skins may be referred to in illustration of this summary of the seasonal colour-changes.

An adult male and female shot on December 20 by Shortridge on the Haleri Estate, N. Coorg, 3,555 ft., have the coat long and soft, deep brown in colour with scarcely a trace of pale speckling in it. Two obtained by J. A. Graham at the same place on January 16, have the coat somewhat coarser and paler.

An adult male from Ghatmatha, Satara (S. H. Prater), dated December 17, is also a deep olive-brown with inconspicuous ticking on the nape and shoulders.

A male and three females from Dharwar, 2,300 ft., (G. C. Shortridge), November 14, are very like the Satara specimen but a little paler.

Six specimens, an adult male and five females, from Samasgi the Kanara Boundary, S. W. Dharwar, 2,000 ft., (G. C. Shortridge), on March 12th, have the coat on the average longer, shaggier and much paler owing to an extensive pale buffish-olive area on the hairs.

A female from Karumbapatti, Salem, April 21st, and a male and two females from Malakondapenta in the Kurnool District, May 14th (N. A. Baptista), have the coat long and shaggy, consisting of dead hair extensively olive grey in colour. At a little distance these skins appear to represent a sub-species easily distinguishable from the one represented by the deep brown skins from Satara and the Haleri Estate in North Coorg; but the differences between them and the series from Samasgi in S. W. Dharwar are comparatively slight.

The examples in the British Museum I assign to this race were collected in the following districts:—

Satara (S. H. Prater). Dharwar 2,300', Kanara 2,000', (G. C. Shortridge), Kurnool (N. A. Baptista), Mysore, Devikop in S. Mahrata, N. Coorg 3,555', S. Coorg 2,000' (G. C. Shortridge), Shevaroy Hills 4,500' (N. A. Baptista), Nilgiri Hills 5,120' (P. Gosse), Kodaikanal 5,500' (C. McCann), Cochin 1,500' (R. O'Brien), Palni Hills 3,000'–4000' (R. O'Brien and C. McCann).

There are, however, a few specimens from other localities which deviate from them in certain particulars regarding colour. For example, a full-grown male from Vijayanagar in Bellary 1500', obtained by Shortridge on August 12th, can be picked out at once by the distinct yellowish speckling giving a greener aspect to the pelage, the bonnet and forehead and the base of the tail are not so dark and the legs below the knees are greyer. But a young male from the same place, shot on August 4, is like the series from Dharwar.

Very similar greenish yellow speckling may be seen in two examples obtained by J. Riley O'Brien on May 28th at Shernelly in Cochin 1,500'. Superficially these examples are tolerably uniformly olive-brown in colour, the coat being dull and in process of moulting. But the speckling is revealed in the newly erupting hair when the old coat is parted.

These markedly yellow-speckled specimens coming from widely separated districts may for the present be set aside as varieties.

A pale example of a different type, an immature female from Cumbum in Madura obtained by S. H. Prater on May 17th also looks suggestively different with its annulated hairs from the typical form. But that too must be set aside.

Another specimen, a sub-adult female collected by G. C. Shortridge on May 27th at sea-level below the Gersoppa Falls in Kanara, differs from the typical form in exhibiting a decidedly reddish-brown tinge especially on the flanks, shoulders and sides of the neck, and to a lesser degree on the limbs and tail. As may be inferred from the date the pelage is lustre-less and no doubt faded. Probably the reddish tint would have been brighter five or six months earlier. A young one, collected with her, is, however, normally tinted. She measured in the flesh: head and body 1 ft. 6 $\frac{2}{5}$ ins., tail 1 ft. 9 $\frac{3}{5}$ ins.; total 3 ft. 4 ins., and her weight was 9 lbs.

Provisionally at all events I treat this example as an erythristic sport. It is, however, the only representative of this monkey taken at sea-level that I have seen; and the interest of the coloration lies in its approximation to that of the Ceylonese Toque. Possibly the record of the Toque from India by Gray was due to his knowledge of similar reddish specimens of the Bonnet. The skin is quite as red on the back as some specimens of the Toque, but it does not show the redness of the thighs observable in the brownest examples of the Ceylonese species.

Two specimens appear to represent a distinguishable local race, which may be described as follows:—

Subsp. *M. radiata diluta* nov.

Differs from typical *M. radiata* in being much paler in tint throughout. The hairs of the forehead are buff with darker tips, those of the 'cap' are a pale brownish buff without dark tips but grey at the base. The hairs of the neck and shoulders are long and, like those of the rest of the back, have long buff tips. The arms, legs and tail are correspondingly paler and buffier. The hairs of the belly and of the insides of the limbs instead of being whitish grey are creamy white, and the skin of the chest and abdomen is pallid, not dark blackish grey.

Locality: Boothapaundy in Travancore.

Two female examples, one nearly adult, the other younger, obtained by R. S. Pillay on November 18. The skins are in good coat and differ noticeably in their paler coloration from examples of typical *radiata* shot by Shortridge on November 14 at 2300' in Dharwar. They more nearly resemble the pallid, faded skins obtained on March 12 at Samasgi in S. W. Dharwar and those from

Salem and Kurnool obtained on April 21 and May 14 respectively, but are not the same tint above and are noticeably different from them and from all the skins of typical *radiata* obtained at various months of the year by the absence of dark pigment in the integument and by the creamy tint of the hairs of the under side.

The dimensions of the two skins, the adult measuring: head and body 1' 4 $\frac{4}{5}$ "", tail 1' 10 $\frac{4}{5}$ "", total 3' 3 $\frac{3}{5}$ "", and the younger: head and body 1' 1 $\frac{3}{5}$ "", tail 1' 9", total 2' 10 $\frac{3}{5}$ "", show that this monkey is as large as typical *radiata*, a conclusion borne out by the measurements of the skull of the type entered on the subjoined table.

The measurements and weights, taken in the flesh, of some of the examples of *M. radiata*, collected by the Mammal Survey, are as follows:—

Locality and Sex	Head & Body	Tail	Total	Weight	Remarks
Vijayanagar, Bellary, ♂ ad.	1' 11 $\frac{4}{5}$ "	2' 3"	4' 2 $\frac{4}{5}$ "	19 $\frac{1}{2}$ lbs.	Typical <i>radiata</i> .
Dharwar, ♂ ad.	1' 10 $\frac{4}{5}$ "	2' 0 $\frac{4}{5}$ "	3' 11 $\frac{3}{5}$ "	...	,,
Haleri Estate, N. Coorg, ♂ ad.	1' 9 $\frac{1}{5}$ "	1' 8"	3' 5 $\frac{1}{5}$ "	13 lbs.	,,
Samasgi, Kanara, ♂ ad.	1' 9 $\frac{1}{5}$ "	1' 10 $\frac{3}{5}$ "	3' 7 $\frac{3}{5}$ "	14 $\frac{1}{2}$ lbs.	,,
Ghatmatha, Satara, ♂ ad.	1' 8 $\frac{1}{5}$ "	2' 1 $\frac{3}{5}$ "	3' 9 $\frac{4}{5}$ "	16 lbs.	,,
Dharwar, ♀ ad.	1' 8 $\frac{3}{5}$ "	1' 10 $\frac{3}{5}$ "	3' 7 $\frac{1}{5}$ "	...	,,
Samasgi, Kanara, ♀ ad.	1' 7 $\frac{1}{5}$ "	1' 8 $\frac{4}{5}$ "	3' 4"	8 $\frac{1}{2}$ lbs.	,
Haleri Estate, N. Coorg, ♀ ad.	1' 6 $\frac{3}{5}$ "	1' 5 $\frac{1}{5}$ "	2' 11 $\frac{3}{5}$ "	8 $\frac{1}{2}$ lbs.	,
Wottekolle, S. Coorg, ♀ ad.	1' 6"	1' 8 $\frac{1}{5}$ "	3' 2 $\frac{1}{5}$ "	...	,,
Boothapaundy, Travancore, ♀ ad.	1' 1 $\frac{1}{5}$ "	1' 9"	2' 10 $\frac{1}{5}$ "	...	Type of <i>diluta</i> .

With regard to general superiority in size of the males over the females, this table confirms the table giving weights and measures of the specimens collected in the Eastern Ghats. The two sexes do not always differ greatly in actual length, but males are always considerably heavier. The specimens enlisted above are the largest procured. Special attention may be drawn to the very big male shot by G. C. Shortridge in Bellary and to the big female, as long as many males, obtained by him in Dharwar. The female from Samasgi is the largest of a series of six, the weights of the others being 8 lbs. The tail, it may be seen, is as a rule longer than the head and body. Where it is shorter, the great possibility of artificial abbreviation must be borne in mind.

The Skull of M. radiata.

Blanford described the skull of this monkey as 'long, flattened over the brows with the orbits much broader than high and vertical,' and he gave the total length and zygomatic width of the skull of an

adult male as 4.8 inches (=120 mm.) and 3.5 inches (=87½ mm.) respectively. Since all the skulls of adult males I have measured are much narrower across the cheek-bones and have the orbital sockets approximately circular and sometimes higher than wide, I have no doubt that he selected for measurement one of the several skulls, in the British Museum, of examples of this monkey that had been reared in captivity, probably in the Zoological Gardens. These may be distinguished at once by their low brows, imparting a peculiarly scowling aspect to the skull, as well as by other characters from the skulls of wild-killed specimens. Blanford's record is therefore valueless.

The following table gives some dimensions in millimeters of male and female skulls of the two races recorded above. The table shows the difference in cranial size between the males and females of *M. radiata* and also some of the individual differences between members of the same sex:—

Locality and Sex		Total length	Zygom Width	Orbital Width	Upper Molars	Lower Jaw	Remarks
Coorg	♂ ad.	121	78	61	32	87	Typical race.
„	♂ ad.	119	77	57	31	86	„
Nilgiri Hills	♂ ad.	117	80	65	30	84	„
Kotagiri, Nilgiris	♂ ad.	116	77	59	31	80	„
Coimbatore	♀ ad.	105	67	56	29	72	„
Coorg	♀ old.	105	72	58	29	73	„
„	♀ old.	103	68	54	30	71	„
Kotagiri, Nilgiris	♀ old.	104	69	55	30	...	„
Dharwar	♀ ad.	102	69	55	30	73	„
„	♀ ad.	99	63	51	28	69	„
Kanara (sea-level)	♀ young	100	...	53	...	...	Reddish variety.
Travancore	♀ ad.	105	72	56	28	...	Type of <i>diluta</i> .

Apart from size, the two adult male skulls from Coorg differ in the shape of the palate and of the orbits. In the larger example, the rows of cheek-teeth are approximately straight and parallel, and the orbital sockets are nearly circular, measuring 20 by 20 mm. In the smaller the rows of cheek-teeth are noticeably arcuate and the orbital sockets are higher than wide, measuring 22 by 20 mm. Female skulls may, of course, be at once distinguished from male skulls by their small canine teeth, accompanied by a narrower and

shorter muzzle. In shape they resemble the skulls of sub-adult males; but the cheek-teeth are only slightly shorter than those of males, and the orbital sockets are quite as large.

THE TOQUE MACAQUE (*Macaca sinica*).

Examination of the specimens of the Bonnet Macaque suggested a revision of the specimens in the British Museum, mostly obtained by the Mammal Survey, of its Ceylonese ally the Toque Macaque (*M. sinica*). The skins proved a puzzling series and perhaps the following remarks about them may prove of interest:—

Differences between the Bonnet and the Toque Macaques.

The degree of kinship between these two monkeys has always been open to doubt. Most authors have treated them as distinct on account of the prevalent difference between them in colour and the alleged difference in size, the Ceylon form being redder and smaller than the Indian. Such characters, however, have only a sub-specific value in the case of the Crab-eating Macaque of Malaya and the Sunda Islands; and Blanford, after describing the Bonnet and the Toque, said 'it is very doubtful if there is any constant difference, [between them]. For my own part, I doubt if the two are entitled to specific distinction.' Hinton and Wroughton, however, claimed that, apart from its red colour, the Toque may be distinguished by the forward growth of the hairs up to the eyebrows on the forehead, the corresponding hairs in the Bonnet diverging sideways from a median parting.

Comparison of the skins in the British Museum shows that none of these three characters is absolutely distinctive and constant. But there is one difference, hitherto unnoticed, which appears to admit of no exception. In the Bonnet Macaque, the hair on the cheek in front of the ear grows upwards from the throat and lower jaw to the level, or nearly so, of a line running from the eye to the summit of the ear where the tips meet those of the hairs of the crown which diverge transversely from the middle line. In the Toque Macaque, the hairs on the cheek in front of the ear slope obliquely downwards and backwards and meeting the upwardly growing hair from the throat and lower jaw form a distinct whorl on the cheek and often a definite crest below the ear. This whorl varies in size and distinctness, possibly due in part to the 'make-up' and shrinkage of the skins; but it is always detectable.

Variations in the Toque Macaque.

The available skins of this monkey are not sufficient to supply a full explanation of the variations in general colour and in the growth of the hair on the forehead.

A series of five collected by Major E. W. Mayor between September 24th and October 4th at Maukeni on the coast of the Eastern Province, may be selected as a basis for comparison.

Two adult males, weighing 12 lbs. and 10 lbs. respectively, have the fore part of the back reddish brown; this tint increases in brightness on the hind back and loins and is especially bright, almost orange, on the outside of the thighs and shoulders but becomes duller and dies away distally on the limbs, the arms being brighter than the legs. The tail is greyish brown to blackish above, speckled with orange at the base. On the head the 'cap' consists of long radiating hairs, greyish below and yellowish buff at the tip, which overlies and mostly conceal laterally and in front a fringe of shorter hairs rendered conspicuous by a bright orange band preceding the black tip. The hairs of this fringe, which narrows in front, grow forwards up to the eye-brows. The cap is set off by greyish hairs on the cheek and over the ear. The under side of the body and tail and the inner sides of the limbs are clothed with whitish grey hairs.

A half-grown male, weighing 6 lbs., resembles the adults in colour; but the fringe does not cover the forehead, a short area behind the eye-brow being covered with hairs growing backwards and outwards.

A female, unmeasured and undated, has the brow as in the young male; but the pelage is less brightly coloured than in the males.

A very young male, weighing only 2 lbs., is well coloured, but has the long hairs of the cap much shorter and not overlapping the forehead which is covered to the brow with short hairs directed forwards and outwards, there being no definite orange-edged fringe.

Compared with this series an adult female from Tellula 300,' in Ura, shot in April, and an adult female from Wellawaya in Ura, shot in July, are as richly coloured as the adult males from Mankeni and have the forehead similarly covered to the brow by the orange-edged fringe. The coat in the female from Wellawaya is, however, a little longer. A young one killed with her is also very like the young one from Mankeni.

In north western Ceylon Major Mayor also secured some interesting specimens. An adult male shot at Cheddikulam on November, 11th has the forehead covered to the brows as in the adult males from Mankeni; but the margin of the fringe is dull buffy yellow, not bright, and the general colour of the head, shoulders, back and arms is yellowish olive without a trace of red. The only red present in the pelage is on the outer side of the thigh, which is orange but not so bright as in Mankeni specimens.

A younger male, three-quarters grown, from the same place and shot on November 26th, is dark brown in hue, also without any bright yellow or orange in the pelage, but a note on the label states that the coat was discoloured by the firing of a lamp in the drying shed. It may be noted, however, that the normal grey of the under side is unaltered. In this younger specimen the area behind the eyebrows is uncovered by the cap, its hairs being directed outwards and backwards.

This specimen closely resembles in its brownish tint a young male shot at Kala Oya, N.C.P., in May; and here also the fore part of the forehead is uncovered by the cap. The forehead is similarly

uncovered in a sub-adult female, weighing $6\frac{1}{2}$ lbs., shot at Tammanewa in May; but this specimen is as brightly coloured as the Mankeni series.

The specimens so far described carry no convincing evidence of seasonal colour-change, bright typically coloured reddish-orange tinted specimens being met with in April, May, July, the end of September and the beginning of October. But such evidence is supplied by two examples obtained at Maha Oya in the Eastern Province in August. A sub-adult male, weighing 9 lbs. shot on August 12, has a good deal of the typical orange hue on the thigh, but the coat on the back is short and coarse and dark olive-brown in hue. Beneath it, however, the new coat, with characteristic orange speckling, may be seen sprouting. A younger male, shot on August 17 at the same place, shows the same phenomenon but is redder on the loins and thighs. The cap and fringe on the head in these examples are respectively very similar to those of the adult males and the baby from Mankeni.

Passing reference may here be made to an immature female from Hambantota on the coast of the Southern Province, received many years ago from the Colombo Museum. It is a dark coloured monkey recalling in colour and the uncovered brow the example from Cheddikulam at the northern end of the island. In the tolerably uniform dusky tint of the long radiating hairs of the 'cap', this Hambantota example resembles those described above from the northern and eastern parts of the island; but two other specimens from the Southern Province differ considerably from it in that respect and from each other in other particulars.

An adult, or sub-adult, female from Ranna, collected on May 17, has a large area of the forehead behind the eyebrows covered with short backwardly directed hairs of a yellowish grey hue, and the long radiating hairs of the anterior half of the cap are buffy throughout, a little paler at the tips, and contrasted with the duskier radiating hairs of the hinder half of the cap. The hairs of the neck, shoulders and arms are, moreover, paler than usual, being golden buff rather than orange or red, and these areas are brighter in tint, not duller, than the hinder part of the back.

A young half-grown male, weighing $4\frac{1}{2}$ lbs., from Kottawa on the coast of the Southern Province, is very different from the example from Ranna and in general colour recalls the specimens from Mankeni, but is more brightly tinted, the orange red being everywhere much in evidence in the long coat, and the bases of the hairs are blackish grey. The forehead too is covered to the eyebrows by a fringe of forwardly directed hairs as in the full-grown male examples from Mankeni. But the hairs of this fringe are bright orange throughout; and the long cap of radiating hairs is markedly two-coloured, the hairs of the anterior half being bright orange buff throughout, whereas those of the posterior half are greyish with buff tips and contrast markedly in tint with the hairs of the fore-part, an exaggeration of the same feature exhibited by the Ranna specimen.

An adult female collected by W. W. Phillips on January 15 at Anasigalla Matugama in the Western Province, also has the

anterior part of the cap all buff as in the Ranna and Kottawa specimens. The coat is long as in the Kottawa specimen, but it is only conspicuously red on the loins and thighs, the fore part of the back and the neck being dull brownish, much darker than in typical forms.

Finally, the flat skin of an adult male obtained by Major E. W. Mayor at Roygam Korali, in the Western Province, resembles the example from Kottawa in all essential particulars, i.e., the colour of the cap, the intensification of the orange redness everywhere and of the deep bluish black of the basal part of the hairs. Unfortunately it is undated and unmeasured.

I have described these specimens at some length to illustrate the great variability of the species in colour and in the growth of the hair on the top of the head, two features by which it has been claimed that *M. sinica* may be distinguished from *M. radiata*. The specimens show that the general hue of the body may be almost identical with that of the Indian species, and that the forehead behind the eyebrows may resemble that of *radiata* in the direction of growth of the hairs.

All that can be said of the differences between the two species so far as these features are concerned is that in *M. sinica*, there always seems to be a certain amount of orange-red on the thighs, and that the short-haired area between the eyebrows and the 'cap' is at all events on the average smaller than in *M. radiata* and seldom exhibits so conspicuous a median parting.

The following table shows the weights and measurements, taken in the flesh, of some adult or almost adult examples of *M. sinica* :—

Locality and Sex			Head & Body	Tail	Total	Weight
Cheddikulam, ♂ ad.	...	...	1' 6 $\frac{2}{3}$ "	1' 10 $\frac{2}{3}$ "	3' 4 $\frac{2}{3}$ "	10 $\frac{1}{4}$ lbs.
Mankeni, ♂ ad.	...	...	1' 7 $\frac{1}{8}$ "	1' 11 $\frac{2}{8}$ "	3' 6 $\frac{3}{8}$ "	12 lbs.
Mankeni, ♂ ad.	...	...	1' 5 $\frac{3}{8}$ "	1' 9 $\frac{3}{8}$ "	3' 3 $\frac{3}{8}$ "	10 lbs.
Kala Oya, ♂	...	...	1' 5 $\frac{1}{4}$ "	1' 8"	3' 1 $\frac{3}{4}$ "	9 lbs.
Wellawaya, ♀	...	...	1' 4 $\frac{4}{8}$ "	1' 10"	3' 2 $\frac{4}{8}$ "	...
Ranna, ♀	...	...	1' 4 $\frac{1}{2}$ "	1' 7 $\frac{2}{8}$ "	2' 11 $\frac{3}{8}$ "	...
Matugama, ♀	...	...	1' 4"	1' 10"	3' 2"	...

Although the available skins of adult examples of this species is small, this table, when compared with the table on p. 279, bears out the claim put forward by Kelaart that the Ceylonese species is smaller at least on the average than its Indian ally.

I agree with Blanford that there is no character by which the skulls of *M. sinica* can be distinguished from those of *M. radiata*. In both species, the skulls are liable to a good deal of individual variation.

The following table gives a few of the dimensions in millimetres of some of those that I have examined :—

Locality and Sex	Total Length	Zygom. Width	Orbital Width	Upper Molars	Lower Jaw
Koliyagalla, ♂ ad. ...	117	78	67	30	83
Mankeni, ♂ ad. ...	112	...	...	27	81
„ ♂ ad. ...	110	79	62	31	82
Tellula, ♀ ad. ...	96	64	52	27	68
Matugama, ♀ ad. ...	95	...	...	27	...

These skulls bear out the evidence supplied by the skins that the average size of *M. sinica* is less than of *M. radiata*.

The two skulls from Mankeni differ considerably when viewed from the front. In the smaller the orbits are circular, measuring 21 by 21 mm., and the orifice of the nostrils is 11 mm., whereas in the larger the orbits are noticeably wider than high, being 21 by 17 mm., and the aperture of the nostrils is 14 mm.

Revising the facts, set forth above, relating to the coloration of examples of this species obtained in various parts of Ceylon, it must be admitted that many of the variations must be set aside as unexplained until more specimens come to hand.

The evidence, however, supports three conclusions :—

- (1) The two specimens from Maha Oya show that the moult begins in August and is accompanied by a marked change in colour when the old brown coat is replaced by new hair with conspicuous orange annulation yielding the red tinge characteristic of typical *sinica*.
- (2) There is a general increase in the redness of the pelage from north to south, the difference in colour between the adult males from Cheddikulam and Roynam Korali being very striking.
- (3) It also seems that examples from the south-western part of the island differ from those from the northern and eastern parts by the tint of the radiating hairs of the cap, a feature particularly noticeable in the very rich red specimen from Roynam Korali, in which the hairs of the anterior half of the cap are noticeably reddish from base to tip.

These facts I think supply evidence for the existence of three distinguishable local races of *sinica*, a conclusion enforcing a decision regarding the coloration of the cap and coat in typical *sinica* for which unfortunately no locality was known. Reliance must in consequence rest upon the descriptions of the Macaque monkey Buffon described as 'Le Bonnet Chinois' to which Linnæus gave the name *Sinica* under the mistaken belief that it came from China. By both Schreber (*Die Säugth.* I, p. 108, 1775) and Audebert (*Hist. Nat. Singes*, Fam. 4, sect. II, p. 17, 1799), this

monkey was described as red ; but neither their descriptions nor their coloured plates indicate that the cap, or bonnet, of radiating hairs was anything but uniformly coloured throughout. I propose, therefore, to restrict *sinica* as a subspecific term to the red examples with uniformly tinted bonnets with dusky buff-tipped hairs. The examples above described from Mankeni and elsewhere farther south in the eastern part of the island may be taken as representative of this race.

The two new races I propose to admit may be named and described as follows :—

Subsp. *inaurea* nov.

Resembling the typical form *sinica* in having the hairs of the anterior and posterior halves of the bonnet alike in colour, but distinguishable by the absence of red from the pelage, apart from the outside of the thighs, the general hue of the head, shoulders, back and arms being yellowish olive, the hairs being merely annulated with greyish buff.

Locality and history of type: Cheddikulam (N. P.), north of Adams Bridge. An adult male collected by Major E. W. Mayor.

Since this example was killed in November, just after the August-September moult, the absence of yellow or orange annulation in the hairs cannot be assigned to fading. A second, younger example, also killed in November at Cheddikulam, similarly lacks the red speckling, but is browner than the type. The skin, however, is said to have been artificially discoloured. A still younger specimen shot in May at Kala Oya to the south of Cheddikulam is also brown without red speckling ; but at Tammanewa, near Kala Oya, the red race occurs.

The likeness in colour between this northern race of *sinica* and the Indian *M. radiata* is interesting.

Subsp. *aurifrons* nov.

Resembling typical *sinica* in the redness of the pelage but brighter coloured, the hairs long, almost purplish black at the base with bright orange-red tips, the arms comparatively brightly speckled to the hands, the outside of the thighs and lower leg almost fiery red, the feet yellow. Hairs of the bonnet very long, those of its anterior half reddish from the base to the tip, of the posterior half dusky greyish at the base, reddish at the tips.

Locality and history of type: Roygam Korali (W. P.) Flat skin of an adult male sent by Major E. W. Mayor, but undated and unmeasured.

A young male from Kottawa (S. P.) agrees very closely with the type in its long coat of bright red and deep black hairs, and it has a frontal fringe wholly golden red throughout. This fringe is concealed in the flat skin from Roygam Korali.

Examples from Ranna and Anasigalla Matugama also have the hairs of the fore half of the bonnet of a uniform colour, without dusky bases, thus differing from the hairs of the hinder part ; but they show none of the vivid coloration of the two specimens

assigned to *aurifrons* and cannot at present be certainly included in the sub-species.

SUMMARY.

The following analytical key setting forth the distinctive characters of the different kinds of long-tailed Macaques from South India and Ceylon will serve as a summary to this paper.

- A. Hairs on the cheek growing upwards from the throat and lower jaw to the level of the top of the ear, or nearly so, not forming a whorl on the cheek; typically a larger short-haired area between the bonnet and the brows; red usually absent from the pelage, never specially in evidence on the outside of the thighs; size on the average larger *Macca radiata*.
- (a₁) General colour of the winter coat brown or olive-brown, at most faintly speckled, fading to buffy or greyish brown before the summer moult; hairs on under side whitish grey; skin of belly blackish. Subsp. *radiata*.
- (a₂) General colour of the winter (Nov.) coat much paler, markedly buffy throughout; hairs of under side pale cream; skin of belly pallid, without dark pigment Subsp. *diluta*.
- B. Hairs on cheek in front of ear growing downwards and backwards and forming a distinct whorl on the cheek where they meet the upgrowing hairs from the throat and lower jaw; hairs on the forehead very variable but typically a shorter area of short hairs between the bonnet and the brows; pelage usually ticked with yellow or red, always so on the outer side of the thigh; size on the average smaller... .. *Macaca sinica*.
- (b₁) General colour brownish olive, annulation of hair yellowish brown, not bright; hairs of the bonnet alike throughout Subsp. *inaurea*.

- (b₂) General colour much brighter, annulation of hair orange, yellow or red, altogether more vivid
- (c₁) Long radiating hairs of the bonnet all alike, greyish at base with buffish tips; hairs of the back not so black at the base or red at the tips Subsp. *sinica*.
- (c₂) Hairs of the anterior half of the bonnet uniformly reddish from base to tip, strongly contrasted with those of the posterior half; hairs of the back redder and blacker Subsp. *aurifrons*.